Havemann et al. discloses a method for forming air gaps between metal leads of a semiconductor device. Figures 5A to 5D illustrate a method for forming air gaps 22 between metal leads 16 having a patterned oxide layer 28 thereover.

Specifically, Figure 5A depicts a cross-sectional view of a semiconductor wafer 10 upon which a first oxide layer 14 has been deposited over substrate 12. A metal interconnect layer is then deposited over first oxide layer 14, and a second oxide layer is deposited over the metal interconnect layer. Next, the second oxide layer and the metal interconnect layer are etched in a predetermined pattern to form etch lines, or metal leads 16 with etched portions 28 of second oxide layer remaining on top of metal leads 16.

Then, a disposable solid layer 18 is deposited over etched portions 28 of the second oxide layer and metal leads 16. The disposable solid layer 18 is then removed (*e.g.* etched back) to expose at least the tops of the etched portions 28 of the second oxide layer, as shown in Figure 5B. A porous dielectric layer 20 is then deposited on the disposable solid layer 18 and the tops of the etched portion 28 of the second oxide layer, as shown in Figure 5C. The disposable solid layer 18 is removed through the porous dielectric layer 20 to form air gaps 22. After removal of the disposable solid layer 18, the porous dielectric layer 20 overlies the air gaps 22 and etched portions 28 the of second oxide layer. Finally, a non-porous dielectric layer 24 is deposited on top of the porous dielectric layer 20 as shown in Figure 5D.

Thus, as is shown in Figure 5C of Havemann et al., the dielectric layer 20 is only contiguous with the etched portions 28 of the second oxide layer and the top portions of disposable solid material 18. The porous dielectric layer 20 is **NOT** contiguous with both the disposable solid material 18 and the metal leads 16.

Claims 43 and 56, as currently pending, recite an overcoat layer of a material overlying the patterned layer of conductive material and the patterned layer of sacrificial material, the overcoat layer being contiguous with both the patterned layer of conductive material and the patterned layer of sacrificial material. Such an arrangement is neither taught nor suggested by Havemann et al.

Accordingly, the claims presented herein are patentable over the art made of record.

Kataoka et al. (U.S. Patent No. 5,783,639) does not overcome the fundamental deficiency of Havemann et al. as a teaching reference vis-avis the claimed subject matter.

Moreover, with regard to claims 46 to 55, Kataoka et al. describes a resin composition comprising an epoxy group-containing cycloolefin resin and a crosslinking agent is provided. More specifically, Kataoka et al. describes a resin composition comprising an epoxy group-containing thermoplastic norbornene resin obtained by introducing epoxy groups into a thermoplastic norbornene resin, and as the crosslinking agent, a curing agent for epoxy resins or a photoreactive substance is provided. The resin composition is suitable for use as an insulating material.

Kataoka et al. has not been found to disclose or suggest the use of a cyclic olefin material as a sacrificial material for the formation of air gaps. Furthermore, Kataoka et al. fails to disclose or suggest the use of both a dicyclic olefin and a norbornene-type polymer as a sacrificial material for the formation of air gaps. Rather, Kataoka et al. is mainly concerned with the formation of a resin composition which contains an epoxy group-containing thermoplastic norbornene and a curing agent, the resin being used as an insulation layer between wires.

II. Conclusion:

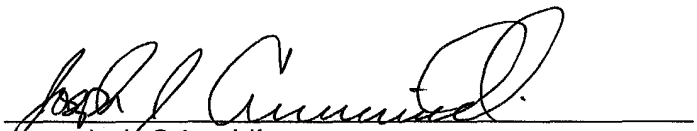
For at least the above reasons, allowance of claims 43 to 58 is respectfully requested.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account No. 18-0988, Attorney Docket No. **BFGBP0217USA**.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, L.L.P.



Joseph J. Crimaldi
Registration No. 41,690

The Keith Building
1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113
C:\Joe\BFGood\P217\P217a\217Arsp2.wpd

APPENDIX

Below is a detailed listing of the changes made to the claims. Please note, underlining denotes additions and [~~bracketed strikeout~~] denotes deletions.

In The Claims:

Claims 43, 56 and 57 have been amended as follows:

43. (Twice Amended) A pre-cursor to a semiconductor device containing at least one area of sacrificial material made in accordance with a method comprising the steps of:

(A) forming a patterned layer of sacrificial material on a substrate corresponding to a pattern of one or more gaps to be formed in the semiconductor structure;

(B) depositing a second material on the substrate within regions bordered by the sacrificial material with the second material being formed with a height less than the height of the adjacent sacrificial material; and

(C) forming an overcoat layer of material overlying the patterned layer of sacrificial material and second material in the regions bordered by the sacrificial material, the overcoat layer being contiguous with both the patterned layer of sacrificial material and the second material,

whereby the height of the one or more areas of sacrificial material exceeds the height of the one or more areas of second material.

56. (Twice Amended) A pre-cursor to a semiconductor device comprising:

a substrate;

a patterned layer of conductive material on the substrate;

a patterned layer of sacrificial material on the substrate, the patterned layer of sacrificial material being greater in height than the patterned layer of conductive material; and

an overcoat layer of a material overlying the patterned layer of conductive material and the patterned layer of sacrificial material, the overcoat layer being contiguous with both the patterned layer of conductive material and the patterned layer of sacrificial material.

57. (Amended) The semiconductor device of claim 56, wherein the overcoat layer is a dielectric layer.